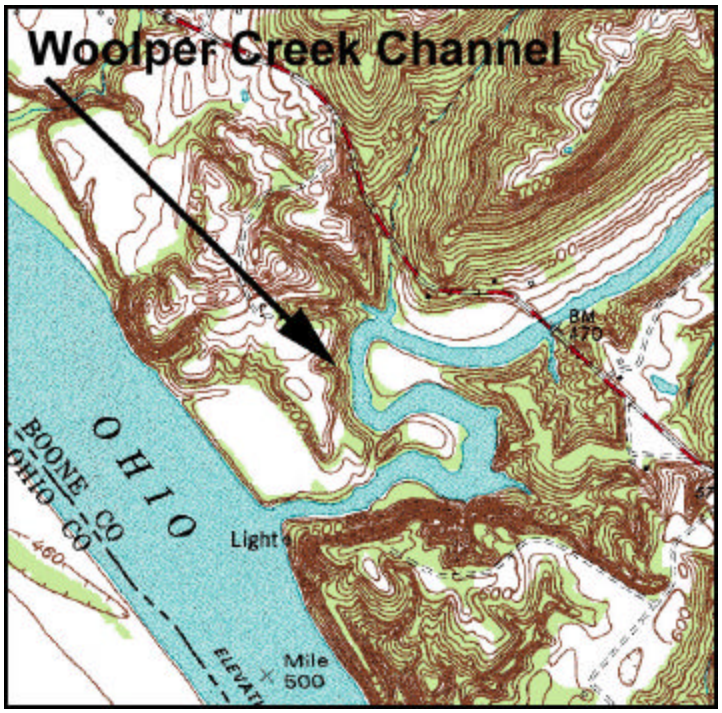
Woolper Creek Channel Restoration (KY-28)

1.0 Location

The proposed Woolper Creek Channel Restoration project area is located in Boone County, Kentucky. The project area is located approximately 3 miles northwest of the town of Belleview, Kentucky. The mouth of Woolper Creek enters the Markland Pool of the Ohio River at Ohio River Mile (ORM) 499.8. The project site is within the Louisville District, U.S. Army Corps of Engineers (USACE).



2.0 Project Goal, Description, and Rationale

The primary goal of the Woolper Creek Channel Restoration project is to restore flow and reduce sedimentation in the natural creek meanders that have been cut off by a man-made channel. The man-made channel was created to allow easier access to a proposed marina in Woolper Creek that was never completed. The main water flow currently passes through the man-made channel resulting in reduced flow and increased sedimentation in the natural cut-off meanders. The shallow, less diverse aquatic habitats in the cut-off meanders provide decreased benefits for fish and for recreational opportunities.

Restoration of the Woolper Creek channel would involve dredging to reestablish depth in the original meanders of the creek. Flow would be restored to the original creek

meanders by placing dredge tubes at each of the areas where the man-made and natural channels intersect. The tubes would act as dams and prohibit water flow through the man-made channel. Restoring flow to the currently cut-off creek meanders would allow for the natural flushing and decreased deposition of soft sediments. The restored creek meanders would provide increased spawning, nursery, refuge, and foraging habitat for fish and other aquatic organisms and provide for increased recreational opportunities.

Dredge material taken from the natural creek meanders would be deposited behind the dredge tubes to fill in the man-made channel and to further prohibit water flow through that area. Excess dredge spoils would be placed in a large pit adjacent to Woolper Creek that was created as part of the proposed marina.

Placement of dredge material within the existing marina pit would help achieve the second goal for this project, which involves establishment of wetlands within the project area. Dredge material would be distributed in the pit in a manner which would promote development of seasonally flooded wetland habitat. These wetlands would provide increased habitat diversity for a variety of species and help maintain water quality.

3.0 Existing Conditions

Terrestrial/Riparian Habitat: A narrow band of riparian forest borders much of the Woolper Creek project area. These forests are dominated by species such as silver maple (*Acer saccharinum*), willows (*Salix spp*.), and others. Agricultural lands and some upland forests are found adjacent to the project area as well.

Aquatic Habitats: Much of the natural meandering channel of Woolper Creek has become silted in due to alterations in water flow following construction of a man-made channel cutting across the area. Aquatic habitat within the cut-off meanders consists of shallow, slow flowing water that provides fewer benefits for the aquatic organisms in the area. The adjacent marina pits are currently filled with water but are not connected to the main channel of Woolper Creek. Therefore, these habitats are not accessible to riverine fishes and provide few ecological benefits.

Wetlands: Approximately 40% of the silted area within the creek meanders is potential jurisdictional wetland habitat. Much of this wetland habitat appears to have developed as the aquatic habitats became silted in and water depths decreased enough to allow hydrophytic vegetation to become established.

Federally-Listed Threatened and Endangered Species: According to the U.S. Fish and Wildlife Service (USFWS), there are 3 federally-listed endangered species and 1 federally-listed threatened species known to occur in Boone County, Kentucky. These species are listed on Table 1.

Bald eagles may utilize forested areas for roosting/perching habitat and feed in the open water areas. No known eagle nests exist within the project area.

The mussels are freshwater species that typically inhabit medium to large river systems. The mussels are typically found in habitats with substrates that range from silt to gravel, and in water depths from 0.5 to 8.0 meters. These species are generally associated with moderate to fast flowing water. There does not appear to be suitable habitat for these species within the proposed Woolper Creek Channel Restoration project area.

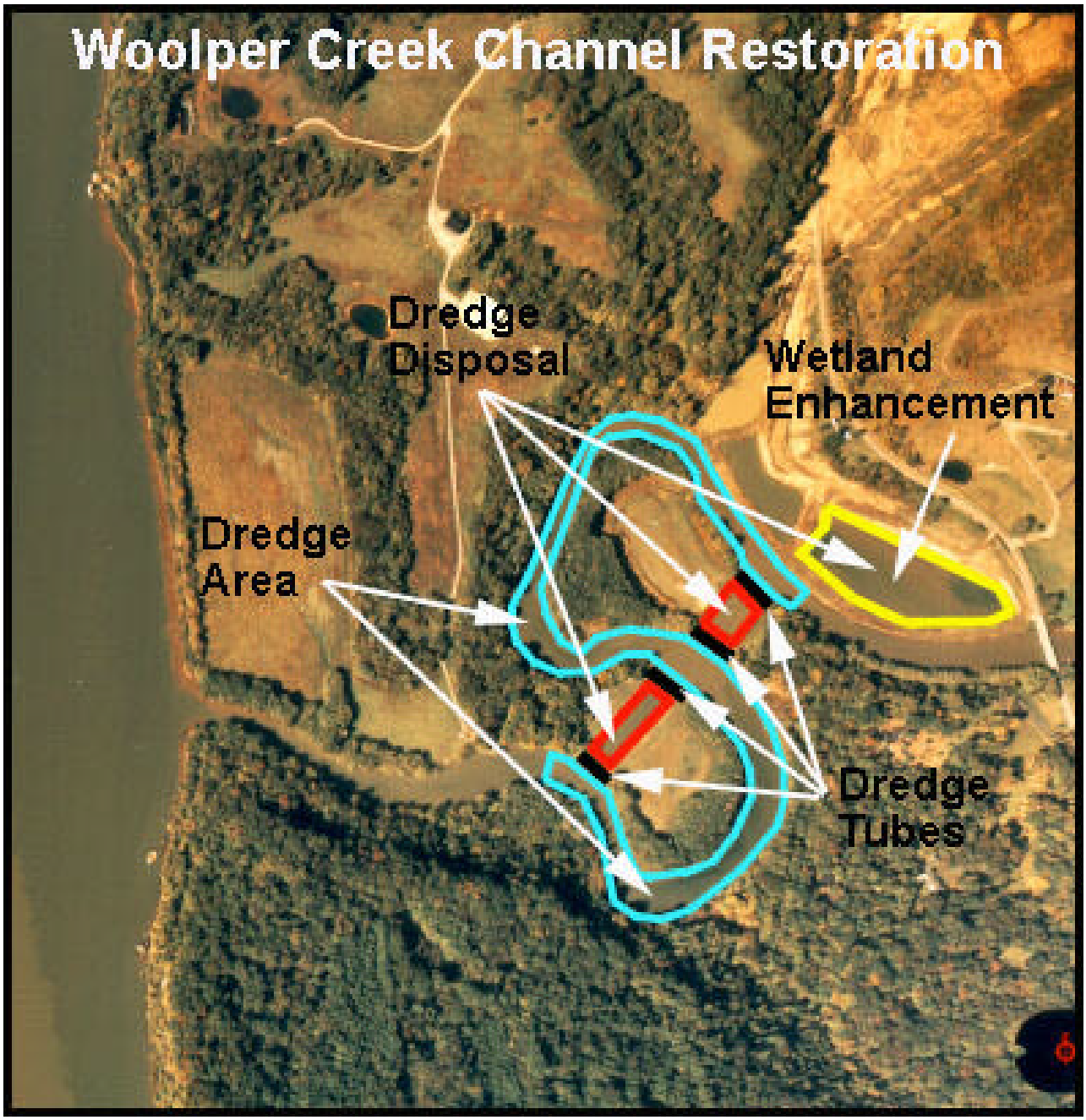
Running buffalo clover is a species most commonly associated with the ecotone between open forest and prairie. It is unlikely that running buffalo clover exists in the project area.

Table 1. Federally-listed species known to occur in Boone County, Kentucky.

Common Name	Scientific Name	Federal Status	Potential Habitat Present
bald eagle	*Haliaeetus leucocephalus*	Threatened	Yes
pink mucket pearly mussel	*Lampsilis abrupta*	Endangered	No
ring pink mussel	*Obovaria retusa*	Endangered	No
running buffalo clover	*Trifolium stoloniferum*	Endangered	No

Source: U.S. Fish and Wildlife Service, 1999

4.0 Project Diagram



5.0 Engineering Design, Assumptions, and Requirements

5.1 Existing Ecological/Engineering Concern

Natural creek meanders in the lower channel of Woolper Creek have become silted in after water flow was greatly reduced following construction of a man-made channel. The man-made channel was created to allow easier access to a proposed marina in Woolper Creek that was never completed. Main water flow currently passes through the man-made channel resulting in reduced flow and increased sedimentation in the natural cut-off meanders. The shallow, less diverse aquatic habitats in the cut-off meanders provide decreased benefits for fish and for recreational opportunities.

5.2 Embayment Dredging

Maintenance dredging of the natural meander of Woolper Creek is required to provide restore deep water habitat. An estimated 212,500 cubic yards (approx. 19 acres) of silty-clay material would be dredged to restore depths of 9-12 feet. Dredged material would be disposed of in the manmade channel and marina pit. Dredge (Geotextile) tubes would be used to contain the material within the man-made channel. Approximately 71,000 cubic yards of the dredge material would be used to fill the dredge tubes and the remaining man-made channel. The excess 142,500 cubic yards of material would be distributed in the marina pit to create shallow seasonally flooded areas.

5.3 Dredge Tubes

Geotextile tubes would be used to confine the dredged material in the existing manmade channel. The tubes would be filled with dredge material to provide dikes to force the water to flow in the natural meander of Woolper Creek. The dredge tube would be filled, and excess water allowed to drain, until the required elevation has been achieved. The tubes would be monitored for settlement two weeks after initial filling is completed. A pressure gage would be installed to ensure the capacity of the tube is not exceeded. After the tubes were filled, dredged material would be pumped behind the tubes to fill the manmade channel. Four tubes, 200 feet in length would be required to successfully seal the manmade channel.

5.4 Planning/Engineering Assumptions

- A small auger head dredge would be used, and the material would be pumped directly to the disposal sites.
- Bottom side slopes will be reshaped to a 3:1.
- All the material required for the levees would be taken from on site.
  A 2,320 gallons per minute (gpm) centrifugal pump would be used for dewatering.

6.0 Cost Estimate (Construction)

Estimated costs for the proposed project are contained on Table 2. A detailed MCACES cost estimate for the proposed project is included in Appendix C.

Table 2. Estimated Costs	
Item	**Cost**
Dredging	$266,600
Dredge Tubes	$100,000
Mobilization	$14,500
TOTAL	**$381,100**

7.0 Schedule

The estimated construction time for this project is shown on Table 3.

Table 2. Construction schedule	
Item	**Time**
Dredging	221 days
Mobilization	4 days
TOTAL	**225 days**

8.0 Expected Ecological Benefits

Terrestrial/Riparian Habitats: The impacts of the Woolper Creek Channel Restoration project would be primarily in-stream. Most of the previously created man-made channel would be filled in and restored to terrestrial habitat.

Aquatic Habitats: Restoration of flow through the creek meanders would provide aquatic habitat for fish and invertebrate species. Nursery, spawning, refuge, and foraging habitat would be increased for many riverine fish species.

Wetlands: Development of wetland habitat within the marina pit would provide additional habitat to many wetland species including waterfowl and wading birds. The wetland areas would also promote water quality improvements.

Federally-Listed Threatened and Endangered Species: There would be no reasonably foreseeable beneficial impacts to federally-listed threatened or endangered species as a result of implementing the proposed project.

Socioeconomic Resources: There would be potential long-term socioeconomic benefits through improved recreational opportunities as a result of implementing this project.

9.0 Potential Adverse Environmental Impacts

Terrestrial/Riparian Habitats: There would be short-term adverse impacts to terrestrial and riparian resources as a result of implementing the proposed project. Construction related noise and disturbance could cause short-term impacts to terrestrial species.

Aquatic Habitats: There may be the potential for short-term adverse affects to sensitive aquatic species downstream of the project area. Construction activities could result in increased sediment entering the creek channel and causing increases in water turbidity.

Placement of dredge material within the marina pit would decrease the amount of aquatic habitat in the area while potentially increasing the amount of wetland habitat.

Wetlands: There would likely be some loss of the wetland habitats that have developed in the silted in creek meanders if water flow was restored to those areas. Increased water depths and flow rates would likely create unfavorable conditions for further wetland development within the Woolper Creek meanders. Existing wetland habitat would be avoided during dredging operations if possible. New wetland habitat would potentially develop within the marina pit after distributing dredge material to create shallow, seasonally flooded conditions.

Federally-Listed Threatened and Endangered Species: There would be no foreseeable adverse impacts to federally-listed threatened or endangered species as a result of implementing the proposed project.

Socioeconomic Resources: There would be no reasonably foreseeable adverse socioeconomic impacts as a result of implementing the proposed project.

10.0 Mitigation

Minor impacts associated with the construction of this project may occur, however, no significant adverse impacts are expected. The use of best management practices and proper construction techniques would minimize adverse water quality impacts.

11.0 Preliminary Operation and Maintenance Costs:

Table 4. Operation and Maintenance Cost

Maintenance	Frequency	Cost
Maintenance Dredging	2 - 25 years	$66,700

12.0 Potential Cost Share Sponsor(s)

- Kentucky Department of Fish and Wildlife Resources

13.0 Expected Life of the Project

It is anticipated that following successful restoration of flow to the Woolper Creek meanders that natural flushing of sediments would occur. Therefore, minimal maintenance is anticipated following the initial construction phases of this project.

14.0 Hazardous, Toxic, and Radiological Waste Considerations

Potential impacts of hazardous, toxic, and radiological waste (HTRW) at the site were visually assessed during a site visit.

Site Inspection Findings.

The project site is along Woolper Creek, which flows from east to west in Boone County, Kentucky where it discharges to the Ohio River at ORM 499.8 in Boone County, Kentucky. The Ohio River flows from northwest to southeast past the mouth of Woolper Creek. There are no towns within a two-mile radius of the mouth of the creek. Riverview Airport in Kentucky is located on the Ohio River about 1.25 miles northwest of the mouth of Woolper Creek.

The following environmental conditions were considered when conducting the July 13, 1999 project area inspection:

- Suspicious/Unusual Odors;
- Discolored Soil;
- Distressed Vegetation;
- Dirt/Debris Mounds;
- Ground Depressions;
- Oil Staining;
- Above Ground Storage Tanks (ASTs);
- Underground Storage Tanks (USTs);
- Landfills/Wastepiles;
- Impoundments/Lagoons;
- Drum/Container Storage;
- Electrical Transformers;
- Standpipes/Vent pipes;
- Surface Water Discharges;
- Power or Pipelines;
- Mining/Logging; and
- Other.

Land around the project site is undeveloped. A channel cut for a marina, which was never developed, is in the embayment area of the creek.

HTRW Findings and Conclusions

None of the environmental conditions listed above were observed in the project area.

15.0 Property Ownership & River Access

Table 5. Property Characteristics

Site Name: Woolper Creek Channel Restoration
Location: Boone County, Kentucky

Map/Parcel Number	Owner	Mailing Address	Market Value	Acreage
3/1A	Charles & Donna Baker	4839 Belleview Rd. Petersburg, KY 41080	$ 118,000*	10.75
3/1C (includes parcel 3/1)	David & Patricia Quast	4503 Belleview Rd. Petersburg, KY 41080	$ 1,865,000*	316.49
3/1C-1	Michael & Sohaila Willis	4779 Belleview Rd. Petersburg, KY 41080	$ 330,000*	31.00
3/2	Aaron & Carol Steinhilber, Jr.	1490 Dublin Place Union, KY 41091	$ 34,000*	< 1 acre

* Denotes improvements on property.

16.0 References

References:	
INHS, 1996	Illinois Natural History Survey Reports, March-April 1996. Survey Document #2152. Center for Biodiversity (J. Hofmann).
USFWS, 1983	U.S. Fish and Wildlife Service, 1983. Northern States Bald Eagle Recovery Plan. USFWS Denver, Colorado
USFWS, 1985	U.S. Fish and Wildlife Service, 1996. Recovery Plan for the Pink Mucket Pearly Mussel. USFWS Atlanta, Georgia.
USFWS, 1991	U.S. Fish and Wildlife Service, 1991. Recovery Plan for Ring Pink Mussel (*Obovaria retusa*). Prepared by R.G. Biggins for the Southeast Region USFWS February, 1991. 24pp.
USFWS, 1997	U.S. Fish and Wildlife Service, 1997. Species Accounts: Pink Mucket Pearly Mussel (*Lampsilis abrupta*).
USFWS, 1999	U.S. Fish and Wildlife Service, August 6, 1999. Federally Listed Endangered and Threatened Species in Kentucky.

APPENDIX A Threatened & Endangered Species

APPENDIX B Plan Formulation and Incremental Analysis Checklist

Project Site Location: The proposed Woolper Creek Channel Restoration project area is located in Boone County, Kentucky. The project area is located approximately 3 miles northwest of the town of Belleview, Kentucky. The mouth of Woolper Creek enters the Markland Pool of the Ohio River at Ohio River mile (ORM) 499.8. The project site is within the Louisville District, U.S. Army Corps of Engineers (USACE).

Description of Plan Selected: The main goal of the proposed plan is to restore water depth and flow in the cut-off natural creek meanders in the lower channel of Woolper Creek. This would involve dredging within the natural creek channel to promote increased water flow and depths. Dredge tubes would be placed at the intersections of the natural and man-made channels to prohibit flow through the man-made channel. Dredge material would be used to fill in the man-made channel.

Wetland habitat would also be created or enhanced as part of the proposed project. Excess dredge spoils not used in filling in the man-made channel would be distributed in the marina pit to promote development of seasonally flooded wetland habitat.

Alternatives of the Selected Plan:

Smaller Size Plans Possible? No

Larger Size Plan Possible? Yes. Increase the amount of dredging to provide more deepwater habitats.

Other alternatives? No

Restore/Enhance/Protect Terrestrial Habitats? No **Objective numbers met**

Restore, Enhance, & Protect Wetlands? Yes **Objective numbers met** W3

Restore/Enhance/Protect Aquatic Habitats? Yes **Objective numbers met** A1, A2, A6

Type species benefited: Mainly aquatic species, especially riverine fishes

Endangered species benefited: Endangered species are not likely to directly benefit from implementation of this project.

Can estimated amount of habitat units be determined: Approximately 19 acres of the Woolper Creek channel would be restored with implementation of this project.

Plan acceptable to Resources Agencies?
U.S. Fish & Wildlife Service?
State Department of Natural Resources?

Plan considered complete? **Connected to other plans for restoration?**

Real Estate owned by State Agency? No **Federal Agency?** No
Real Estate privately owned? No
If privately owned, what is status of future acquisition? No acquisition would be required to complete the goals of this project.

Does this plan contribute significantly to the ecosystem structure or function requiring restoration? What goal or values does it meet in the Ecosystem Restoration Plan?

Restoration of the Woolper Creek channel would provide aquatic habitat diversity, spawning habitat, nursery habitat, over-wintering habitat, and winter velocity shelters for fishes. Creation of wetland habitats would protect water quality and provide important habitat for a variety of species.

Is this restoration plan a part of restoration projects planned by other agencies? (i.e. North American Waterfowl Management Plan, etc.)

No

In agencies opinion is the plan the most cost effective plan that can be implemented at this location?

Can this plan be implemented more cost effectively by another agency or institution?
Yes / No
Who:

From an incremental cost basis are there any features in this plan that would make the project more expensive than a typical project of the same nature? For embayment type plans is there excessive haul distance to disposal site? More expensive type disposal? Spoil that requires special handling/disposal?

Potential Project Sponsor:

Government Entity:_____
Non-government Entity _____

Corps Contractor _____Date_____

U.S. Fish & Wildlife Representative _____Date_____

State Agency Representative _____Date _____

U.S. Army Corps of Engineers Representative _____Date _____

Terrestrial Habitat Objectives

T1 Riparian Corridors

T2 Islands

T3 Floodplains

T4 Other unique habitats (canebrakes, river bluffs, etc.)

Wetland Habitat Objectives

W1 Forested Wetlands: Bottomland Hardwoods

W2 Forested Wetlands: Cypress/Tupelo Swamps and other unique forested wetlands

W3 Scrub/Shrub Emergent Wetlands: isolated from the river except during high water and contiguous (includes scrub/shrub wetlands in embayments and island sloughs)

Aquatic Habitat Objectives

A1 Backwaters (sloughs, embayments, oxbows, bayous, etc.)

A2 Riverine submerged and aquatic vegetation

A3 Sand and gravel bars

A4 Riffles/Runs (tailwaters)

A5 Pools (deep water, slow velocity, soft substrate)

A6 Side Channel/Back Channel Habitat

A7 Fish Passage

A8 Riparian Enhancement/Protection

APPENDIX C Micro Computer-Aided Cost Engineering System (MCACES)